

IR-1881 (2-2532)

**Title: SEMICONDUCTOR MULTICHIP MODULE PACKAGE WITH  
IMPROVED THERMAL PERFORMANCE; REDUCED SIZE AND  
IMPROVED MOISTURE RESISTANCE**

**ABSTRACT OF THE DISCLOSURE**

5 A multichip module has a substrate, which receives several flip chip and for  
other semiconductor die on one surface and has vias extending through the substrate  
from the flip chip bottom electrodes to solder ball electrodes on the bottom of the  
substrate. Passive components are also mounted on the top of the substrate and are  
connected to further vias which extend to respective ball contacts at the substrate  
bottom. In one embodiment, the bottom surfaces and electrodes of the die are  
insulated and their tops (and drain electrodes) are connected by a moldable  
conductive layer. In another embodiment the top surface of the substrate is covered  
10 by an insulation cap, which may be finned for improved thermal properties. The  
passives are upended to have their longest dimension perpendicular to the substrate  
surface and are between the fin valleys. The insulation cover is a cap which fits over  
the top of the substrate, with mold lock depressions contained in the junction  
between the cap peripheral interior edge and the substrate mating edge surfaces.